

Claims

[c1] What is claimed is:

1. A semiconductor package which is positioned on a first substrate comprising:
a second substrate having a first surface and a second surface;
a chip positioned on the first surface of the second substrate;
a plurality of first bonding balls positioned on the second surface of the second substrate and arranged in a line along a first direction for connecting the second substrate to the first substrate; and
at least a dummy bonding bar positioned on the second surface of the second substrate for connecting the second substrate to the first substrate and preventing the semiconductor package from inclining to one side.

[c2] 2. The semiconductor package of claim 1 wherein the second surface has a rectangular shape, and the first direction is parallel to a long side of the second surface.

[c3] 3. The semiconductor package of claim 2 wherein the longest side of the dummy bonding bar is approximately perpendicular to the long side of the second surface for

preventing the semiconductor package from inclining.

- [c4] 4. The semiconductor package of claim 3 wherein a length of a short side of the second surface is less than 1000 μm .
- [c5] 5. The semiconductor package of claim 1 wherein the dummy bonding bar has a planar third surface connected to the first substrate for preventing the semiconductor package from inclining.
- [c6] 6. The semiconductor package of claim 1 further comprising a plurality of first bonding pads, each of which being positioned between the second surface and each of the first bonding balls, and at least a dummy bonding pad positioned between the second surface and the dummy bonding bar.
- [c7] 7. The semiconductor package of claim 6 further comprising a plurality of second bonding pads positioned on the second surface and a plurality of second bonding balls respectively positioned on the second bonding pads, the second bonding balls being interlaced with the first bonding balls.
- [c8] 8. The semiconductor package of claim 7 wherein a height of the dummy bonding bar is the same as a height of each of the first bonding balls and the second

bonding balls.

- [c9] 9. The semiconductor package of claim 7 wherein the first bonding balls, the second bonding balls and the dummy bonding bar respectively comprise a tin (Sn) based metal containing lead (Pb), and a melting point of the tin based metal is between 180°C and 235°C .
- [c10] 10. The semiconductor package of claim 9 wherein the first bonding pads, the second bonding pads and the dummy bonding pad respectively comprise a tin based metal, which contains no lead and has a melting point between 180°C and 235°C .
- [c11] 11. The semiconductor package of claim 1 wherein the first substrate comprises a build-up printed circuit board, a co-fired ceramic substrate, a thin-film deposited substrate, or a glass substrate.
- [c12] 12. The semiconductor package of claim 1 wherein the chip is an image sensor chip.
- [c13] 13. A method for manufacturing a semiconductor package comprising:
providing a substrate having a first surface and a second surface;
forming a plurality of first bonding balls on the first surface of the substrate, the first bonding balls being ar-

ranged in a line along a first direction;
forming at least a dummy bonding bar on the first surface of the substrate; and
providing a chip and locating the chip on the second surface of the substrate, wherein the dummy bonding bar is utilized for preventing the semiconductor package from inclining to one side.

- [c14] 14. The method of claim 13 further comprising:
providing a printed circuit board and connecting the printed circuit board to the substrate by using the first bonding balls and the dummy bonding bar.
- [c15] 15. The method of claim 14 wherein the dummy bonding bar has a planar third surface connected to the printed circuit board for preventing the semiconductor package from inclining.
- [c16] 16. The method of claim 13 wherein before the first bonding balls and the dummy bonding bar are formed, the method further comprises:
forming a plurality of first bonding pads on the first surface of the substrate, the first bonding pads being arranged in a line along the first direction and the first bonding balls being respectively positioned on the first bonding pads; and
forming at least a dummy bonding pad on the first sur-

face of the substrate, the dummy bonding bar being positioned on the dummy bonding pad.

- [c17] 17. The method of claim 16 further comprising:
 - forming a plurality of second bonding pads on the first surface of the substrate, the second bonding pads being arranged in a line along the first direction and the second bonding pads being interlaced with the first bonding pads; and
 - forming a second bonding ball on each of the second bonding pads.
- [c18] 18. The method of claim 17 wherein the first bonding balls, the second bonding balls and the dummy bonding bar respectively comprise a tin based metal containing lead, and a melting point of the tin based metal is between 180°C and 235°C .
- [c19] 19. The method of claim 18 wherein the first bonding pads, the second bonding pads and the dummy bonding pad respectively comprise a tin based metal, which contains no lead and has a melting point between 180°C and 235°C .
- [c20] 20. The method of claim 17 wherein a height of the dummy bonding bar is the same as a height of each of the first bonding balls and the second bonding balls.

- [c21] 21. The method of claim 13 wherein the first surface has a rectangular shape, and the first direction is parallel to a long side of the first surface.
- [c22] 22. The method of claim 21 wherein a length of a short edge of the first surface is less than 1000 μm .
- [c23] 23. The method of claim 21 wherein the longest side of the dummy bonding bar is approximately perpendicular to the long side of the first surface.
- [c24] 24. The method of claim 13 wherein the chip is an image sensor chip.
- [c25] 25. The method of claim 13 wherein the substrate comprises a build-up printed circuit board, a co-fired ceramic substrate, a thin-film deposited substrate, or a glass substrate.